

## The Answers You Need. When You Need Them.

Metrics' experienced scientists offer method development, validation, and stability testing services to meet your challenging analytical needs and timelines in a cGMP compliant facility. The Metrics difference is a veteran staff, diverse instrumentation, and state-of-the-art facility designed to handle a wide range of **compound types including potent, toxic, light-sensitive, temperature-sensitive, DEA-regulated, and other challenging molecules.** Analytical and Microbiological method development, validation, and stability services are available in support of products developed in Metrics' Pharmaceutical Development Division or as stand-alone analytical services.

### Method Development

Metrics' knowledgeable staff offers a wide-range of technical expertise and utilizes a diverse set of instrumentation to solve your analytical problems. HPLC, GC, IC, and GPC separation techniques are available coupled with UV/VIS, PDA, RI, ELS, MS, FID, TCD, conductivity or amperometric detection options. In addition, Metrics specializes in developing dissolution and drug release procedures for a wide-range of dosage delivery systems including tablets, capsules, suspensions, and transdermals. Particle size characterization, metals analysis, moisture analysis, and microbiological method development services are also available. Methods are developed at Metrics with future validation, transfer, and ease of use in mind.

### Validation

Metrics' scientists will work with you to develop a validation plan to meet the specific regulatory needs of your product. Metrics offers various levels of method validation from abbreviated qualification (specificity, linearity, accuracy etc.) to support early-phase studies to full ICH-compliant validation for late-phase and commercial products (robustness, intermediate precision, reproducibility etc).

### Stability Storage and Testing

Metrics' veteran staff can support your product through its life-cycle from pre-IND to commercial product including routine analysis such as CTM release and stability testing. Metrics offers ICH-compliant stability storage temperatures from -80°C to 60°C and, where applicable, humidity control from < 25% R.H. to 75% R.H. with many intermediate options available. Metrics also has the unique ability to offer customized storage conditions should your products storage needs surpass the ICH requirements. Photostability and thermal cycling (freeze/thaw) studies are also available. All stability chambers are monitored by a building management system that records temperature and humidity every 5 minutes and notifies appropriate personnel if pre-determined alarm criteria are met. Stability scheduling and statistical analysis are managed through SLIM and SLIMStat+, which were developed through a collaborative effort between H&A Scientific (Greenville, NC) and Metrics scientists.



## Analytical Services

### High Pressure Liquid Chromatography (HPLC)

- Stability-indicating gradient HPLC methods for drug substances and drug products
- Isocratic HPLC methods to support nonstability-indicating tests (Dissolution, Content Uniformity)
- Development of rapid uHPLC methods including conversion of traditional methods to uHPLC
- Chiral, Gel Permeation, Reversed-phase, Normal-phase, Ion-pairing, and Ion Exchange separations
- Forced degradation studies
- UV/VIS (including PDA), Refractive Index, Evaporative Light Scattering, and Mass Spectroscopic detection
- Agilent 6530 Accurate Mass Q-TOF equipped with ESI and APCI for MS and MS/MS analyses

### Gas Chromatography (GC)

- Residual Solvents methods (compendial and non-compendial) for drug substances, raw materials, and drug products
- Assay methods for non-solvent volatile impurities and intermediates
- Headspace and direct injection sample introduction for packed and capillary columns
- Flame Ionization (FID), Thermal Conductivity (TCD), and Mass Spectroscopic (MS) detection

### Ion Chromatography (IC)

- Analysis of inorganic cations and anions; organic acids and bases; as well as amino acids and proteins
- Analysis of mono-, di-, oligosaccharide, polysaccharide and their derivatives
- Multiple Dionex Ion Chromatographic HPLCs available with Conductivity and Amperometric detection

### Karl Fischer Moisture Titrations

- Moisture testing of powders, capsules, tablets, suspensions, liquids, and lyophilized products
- Volumetric titration instrumentation including units with homogenizers for analysis of tablets and capsules
- Coulometric titration instrumentation for low-level moisture determinations
- Drying oven sample introduction and/or Ketone-specific reagents for difficult sample matrixes

### Particle Size Characterization

- Malvern Mastersizer S (Laser Diffraction) with Wet or Dry Dispersion options
- Malvern Zetasizer Nano ZS (DLS)
- Olympus BX51 Polarized Light Microscope (Optical Microscopy) with a DP71 Digital Camera

### Metals Analysis

- Trace metals analysis for process impurities and residual catalysts
- Determination of metal counterions for drug substance salts
- Conventional and microwave digestion sample preparation
- ICP-OES, GFAAS, FAAS, and Cold Vapor Mercury instrumentation

### Dissolution and Drug Release

- Water soluble, sparingly water soluble, toxic, potent, DEA-regulated, and unstable compounds
- Capsules, tablets, enteric coated tablets, suspensions, chewables, and transdermal patches
- Immediate release and modified release formulations
- Single medium dissolutions, 2-stage dissolutions, 12- and 24-hour dissolutions
- Intrinsic dissolution testing and dissolution media mapping
- Comparative studies – overencapsulated commercial tablets and capsules
- Apparatus 1, 2, 3, and 5; manual or automated sampling
- UV/VIS and HPLC analysis options

### Raw Materials

- Compendial testing for USP/NF, BP, EP, JP, and ACS monographs
- Dedicated staff of experienced scientists knowledgeable of compendial testing requirements
- Streamlined preparation and testing procedures to meet rapid timelines

### Other Analytical Techniques

- Differential Scanning Calorimetry (DSC) and Thermal Gravimetric Analysis (TGA)
- UV/VIS, TOC, Viscometer, Polarimeter, Refractometer, Osmometer, Fluorometer, FTIR, pH, TLC, Ion-selective Electrodes, Potentiometric and Colorimetric Titrations

### Microbiological Services

Metrics' staff of highly trained microbiologists offers diverse method development, validation, and routine testing capabilities to support your sterile, non-sterile, and/or preserved product lines. Compendial analyses are our most requested services and include pharmaceutical water testing, bacterial endotoxin, sterility, particulate matter, microbial limits, antimicrobial effectiveness, and microbiological potency assays. Additional services include water system validation, microbiological cleaning validation, non-compendial investigational test strategies, and development of alternative test methods for challenging products.

#### Microbial Limits Testing (harmonized USP <61> & <62>)

- Quantitative evaluation of sample bio-load including bacterial and fungal organisms
- Qualitative evaluation for presence/absence of pathogenic organisms
- Non-sterile dosage forms: solids, liquids, powders, emulsions, and suspensions
- Non-sterile excipients and empty capsule shells

#### Antimicrobial Effectiveness Testing

- Demonstration of preservative system effectiveness by challenging final products with high levels of bacterial and fungal organisms
- Sterile and Non-sterile preserved drug products: Nasal sprays, ointments, creams, ophthalmics, otics, injectables, and inhaled products

#### Particulate Matter Testing

- Evaluation of undissolved particles in sterile liquid drug products intended for injection
- Light Obscuration Method utilizing the Hiac Royco Liquid Particle Counting System
- Microscopy Method utilizing the Nikon Eclipse Microscope

#### Bacterial Endotoxin Testing

- Detection of endotoxin present in sterile products and excipients intended for sterile products
- Quantitative Turbidimetric Method utilizing the Pyros Kinetix turbidimetric tube reader
- Qualitative Gel Clot Method

#### Other Microbiological Testing

- **Sterility Testing** for ampoules, vials, and intravenous bags utilizing the Millipore Equinox Steritest System
- **Antibiotic Assay** for potency determination of antibiotics and antifungals utilizing the Cylinder Plate Method
- **Water Testing** including total coliform counts, total heterotrophic counts, turbidity, conductivity, and total organic carbon
- **Water System Validation Services** including USP Purified Water Systems, USP Sterile Water Systems, and Deionized Water Systems